

Service Trip Report GSC-21-02

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Mountain Pine Beetle Activity in Lodgepole Pine: Wilder, Gunnison Highlands, and Gunnison National Forest

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Introduction

In 2019, a mountain pine beetle (MPB) outbreak was identified in the Beaver Creek Drainage in Taylor Canyon on private and National Forest land. Monitoring traps set in 2020 captured 100's to 1000's of beetles per trap in the heart of the outbreak, but few beetles were captured outside of the known outbreak area. The MPB flight ramped up quickly in early July, stayed high into August, and was negligible after September. Transect data shows the outbreak is still most intense in the northeast quadrant of the project area and is increasing to the south and east. Aerial and ground surveys showed approximately 600 acres of affected stands. Removal of infected lodgepole pine occurred on private land within the active outbreak prior to July 1, 2020 (Phase I) and mostly on Forest Service land during fall 2020 (Phase II) totaling 260 acres. Continued removal of infested trees, prior to the mountain pine beetle flight in July 2021, will help suppress the beetle population. Limitations for managing the outbreak include the expansion into the nearby Fossil Ridge Recreation Management Area, landowner cooperation, cost of treatment, and land accessibility. Current drought conditions are also favorable to the beetles. The following executive summary is based on a technical report by Forest Health Protection.



Figure 1. Red lodgepole pine killed by mountain pine beetle mixed with green (live) lodgepole pine and aspen, Gunnison National Forest 2020.



Figure 2. Photographs from the Phase I cut at Wilder-Gunnison Highlands. Top left: Logging equipment at the base of the first cut; Top right: mountain pine beetle monitoring trap adjacent to the selection cut of lodgepole pine over 5 inches in diameter; Bottom left: bluestained timber; Bottom right: Helicopter logging on Wilder hillside.

Treatments

Quick action was taken to reduce the risk of the outbreak spreading into a larger landscape epidemic. Partners include USDA Forest Service, Colorado State Forest Service, National Forest Foundation, and landowners of the Wilder and the Gunnison Highlands communities. Removal of infested trees (sanitation) and host tree reduction included selection cuts of lodgepole pine above a 5 inch diameter, and helicopter logging of infested trees in steep areas (Figure 2). In June 2020, the Phase I treatments were completed on approximately 100 acres of private land before beetle flights began in July. The Phase II treatment was started in October 2020. Phase II harvest was mostly conducted on Forest Service land and some small cuts on private land in the Gunnison Highlands subdivision. Treatments totaled 260 acres for 2020, removing nearly 50 thousand beetle-infested trees. Phase III will be completed with additional acres cleared of currently infested trees by helicopter logging on the northeast side of the project area (Figure 3).

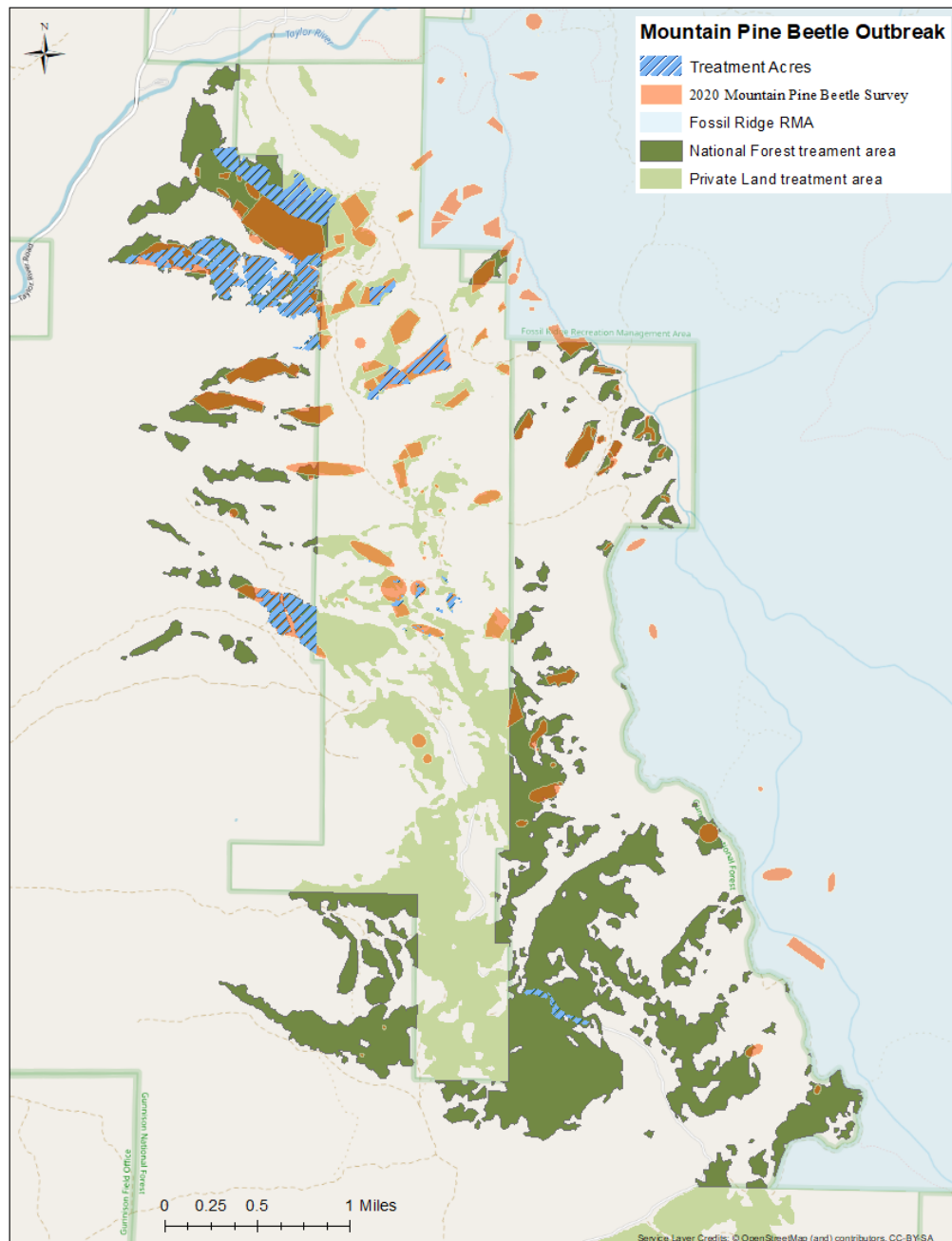


Figure 3. 2020 MPB survey in the Wilder-Gunnison Highlands area, including areas treated in 2020.

Survey Results

This survey included aerial, NAIP, and on-the-ground observations. It indicated approximately 600 acres of mountain pine beetle activity in the Wilder-Gunnison Highlands area (Figure 3). Most areas had multi-year infestations. The severity was generally low with scattered pockets of tree mortality. Most of the current activity was found south/south-east of the outbreak. There is mortality scattered in the Fossil Ridge Recreation Management Area, concentrated on the western side of Beaver Creek; there are very limited treatment options within the RMA.

Mountain Pine Beetle Flights

Twenty-five baited traps were distributed through the Wilder-Gunnison Highlands area to assess the mountain pine beetle. Trap data indicates the timing of the mountain pine beetle flight and where beetles were most abundant. Beetle flights ramped up quickly in the first week of July (Figure 6). While the peaks varied by location, they all occurred between early July and early August, after which the populations slowly declined into September. By October, very few mountain pine beetles were found in the traps, and most traps were empty when checked (Figure 6).

Annual catch totals by trap varied from almost zero to 1,000 per trap, with most of the beetles caught by a small subset of traps (light blue in Figure 4 represents total beetles caught by date). This is still a fairly localized outbreak and beetle population was reduced by removal of infested material before flights began in July 2020. Trap catches verified that the northeast quadrant of the Wilder-Gunnison Highlands project area still holds the largest populations of beetle. The base of Wilder hill (which was helicopter-logged in June 2020) showed very small populations by trap (darkest blue, Figure 4). The road at the top of the hill (yellow, Figure 4) had by far the most beetle captured and was treated in October 2020 after beetle trap monitoring was completed. The gray and orange traps were installed in June, at the base of Phase I spring cuts; a substantial amount of beetles were captured in the area. The traps placed in the southern half (light blue, Figure 4) of the project area had relatively small catches, which slightly increased through the season as more beetles populated those areas through the summer.

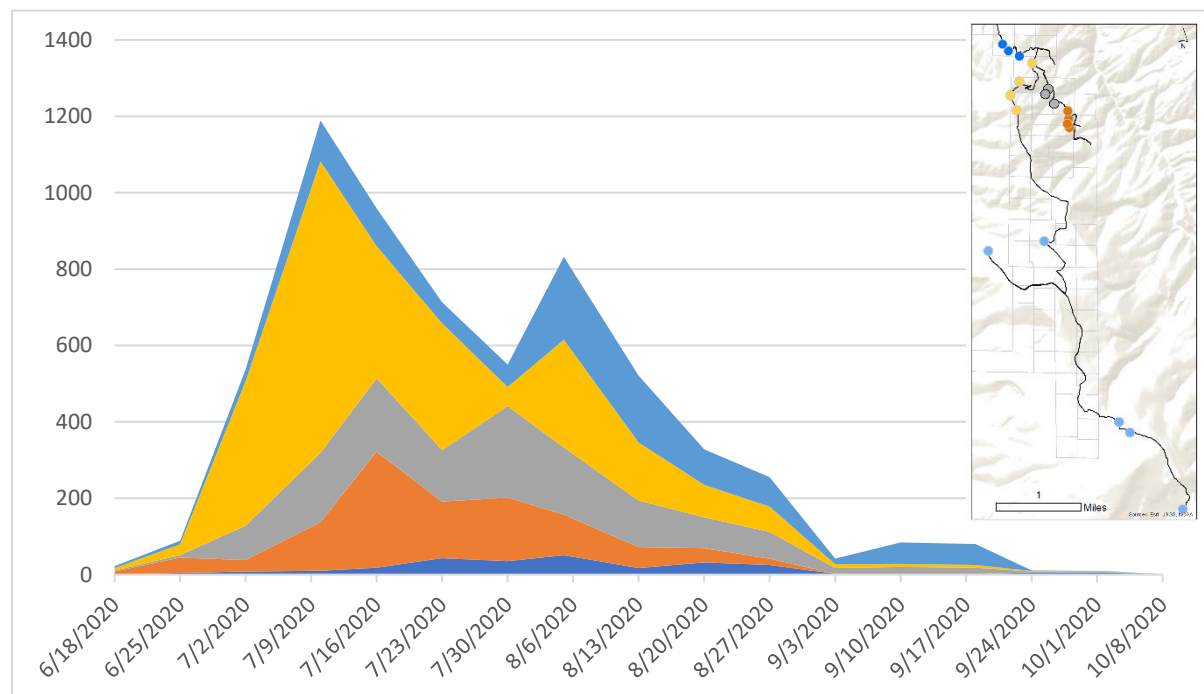


Figure 4: Mountain pine beetle trap collections. The weekly number of mountain pine beetle captured in baited funnel traps from mid-June to mid-October, 2020. Baited traps were collected weekly in and around the Wilder-Gunnison Highlands project area. Traps were subtotaled by area: see map inset for trap locations and coordinating colors. The top line indicates the total number of beetles captured each week, while each color within indicates the amount contributed by the subtotaled traps.

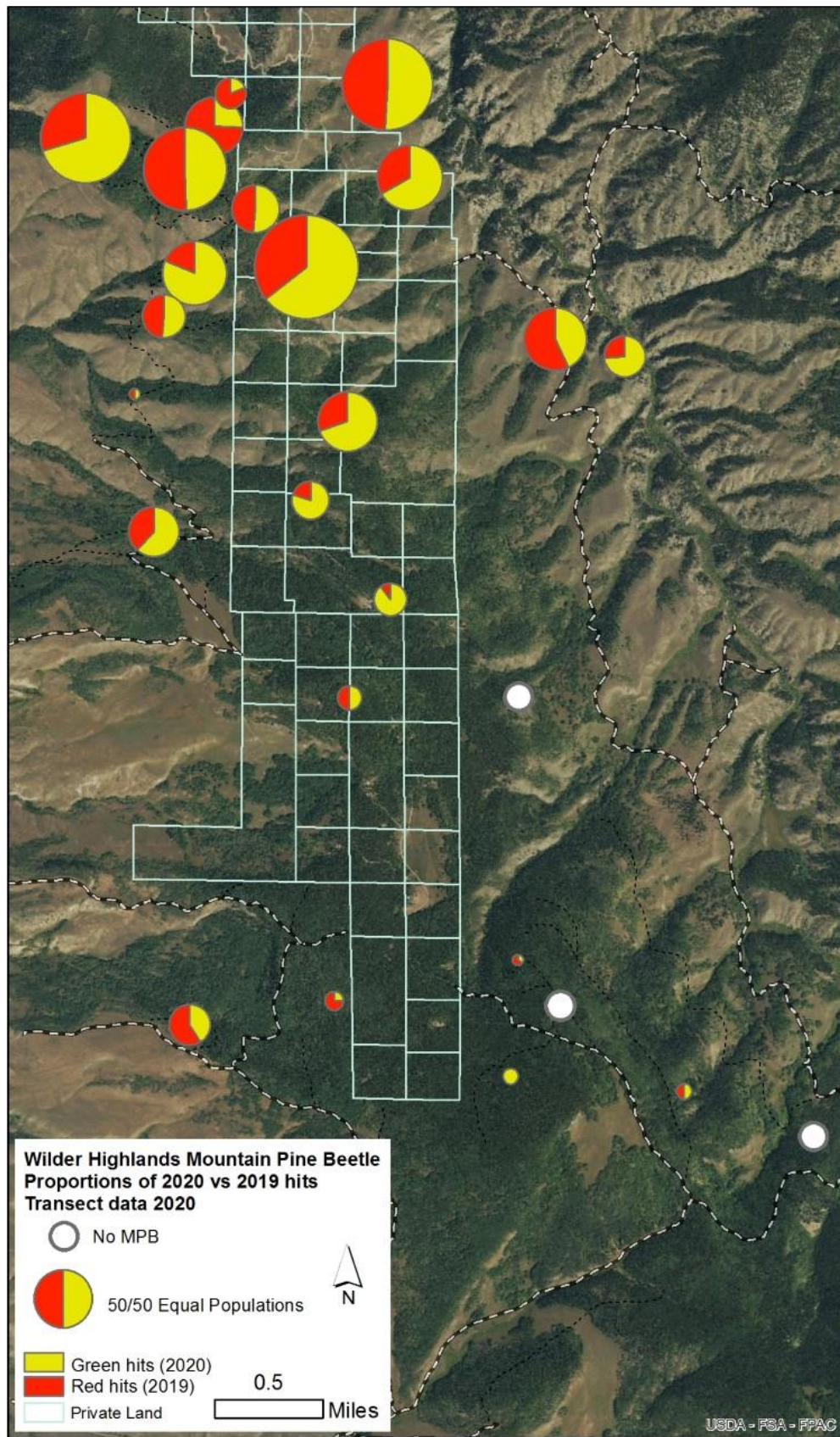


Figure 5. Transect map: approximate locations of each transect completed in the area.

Stand Level Populations

In Fall 2020, 27 transects were surveyed throughout the Wilder-Gunnison Highlands and National Forest land to provide an estimate of beetle infestation levels in forest stands. Each transect covered four acres ($\frac{1}{2}$ mile long and 1 chain wide). Plots were established at the center and end of each transect for stand characteristics. They were 1/20th fixed radius plots. Along each transect, recently attacked trees were counted and broken into two categories: trees attacked in 2020 (green trees with pliable pitch tubes present, referred to as green hits) and trees attacked in 2019 (trees fading with red needles and older pitch tubes, referred to as red hits). See Figure 5.

Transects showed 0 to 23 trees per acre hit per year, the majority of which had less than five trees hit per year. The average across all of the transects was approximately five hits per year, with no significant difference between years. This means the overall population growth remained steady, with some populations growing and some shrinking. The very southern section of the study area had very small beetle populations with some hitting fewer trees in 2020 than the year prior. The middle section of the study area had the most growing populations. There were large, but more stable or shrinking populations in the northern section, which we attribute to both running out of susceptible cover type and sanitation efforts.

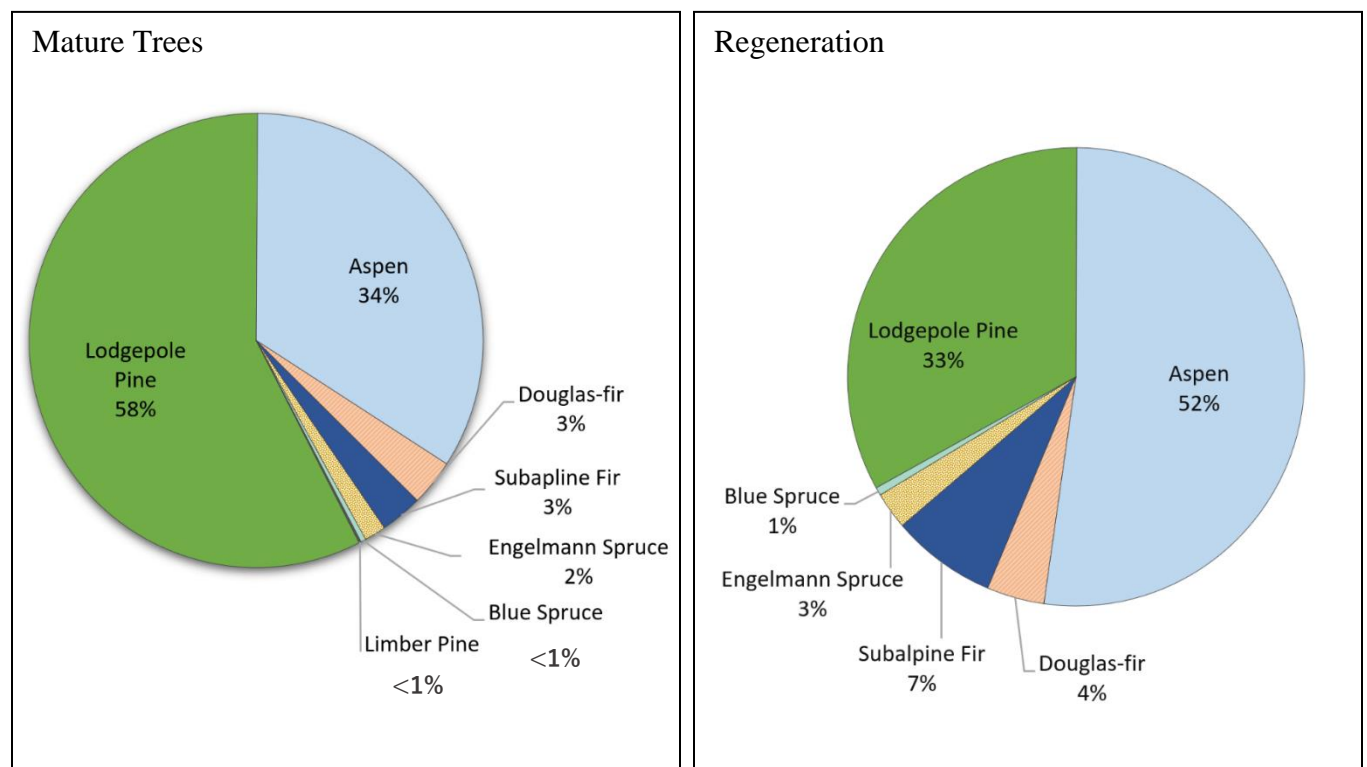


Figure 6. Pie chart of average species composition of plots. Mature trees (left), regeneration (right).

Conclusions

The outbreak of mountain pine beetle in the Wilder-Gunnison Highlands project area is still relatively localized and slowly increasing. Some of the stands with the highest beetle populations have already been treated or will be before the beetle flight resumes next July. Most of the remaining stands have scattered areas of mortality interspersed with green lodgepole pine suitable for mountain pine beetle. The highest populations remain in the northern third of the treatment area, with populations growing to the east and south.

There are a variety of methods available for treating stands affected or in danger of being attacked by mountain pine beetle. In stands that have currently infested trees, sanitation and treatment of the infested trees can slow the growth of the beetle population locally. Treatment of infested logs can be in the form of removal from the site, peeling off the bark, or burning of the logs on site while the beetle larvae are still developing in them. Currently infested trees should be identified in late summer (after peak beetle flight) and sanitation treatments carried out before the next flight in the early summer (before July). Sanitation efforts often require returning to the same stand for two or three years consecutively as infested trees are frequently missed.

Larger scale silvicultural treatments, including thinning or clearcutting, can be used in both infested and un-infested stands. Forest management, such as maintaining a diversity of age classes, diversity of species where possible, and reducing basal area where it fits management objectives, is the best way to minimize extensive losses to the beetle over long periods of time. When applied over a larger landscape, these types of treatments provide a longer-term reduction in hazard to beetle infestation. Forest sanitation in 2021 should be completed before the beetle flight in early July.

Gunnison Service Center Forest Health Protection would like to thank the rapid response to the Wilder-Gunnison Highlands project from our partners: Colorado State Forest Service, National Forest Foundation, the USDA Forest Service, and the communities of Wilder and Gunnison Highlands. Please reach out to our Service Center if you have any questions or additional needs.



Figure 7. Landscape vista dotted with red lodgepole pine killed by mountain pine beetle mixed with green (live) lodgepole pine, and aspen, Gunnison National Forest 2020. Photo: Forest Health Protection.